EU-UNEP Africa Low Emissions Development Strategies (Africa LEDS) Project

Annual progress report as at September 2017

Reporting period	**09/2016–09/2017 (N/A)[1]**

Description

ENRTP/GPGC strategic priority	Climate change	EC Directorate General	DG CLIMA
UNEP/MEA programme of work	UNEP programmes of work 2016-2017, 2018–2019		
Project title	EU–UNEP Africa Low Emissions Development Strategies Project (short title: Africa LEDS Project)		
Geographical coverage	Cameroon, Côte d'Ivoire and Democratic Republic of the Congo for component 1, plus: Ghana, Kenya, Morocco, Mozambique and Zambia for component 2. In addition, a subregional and region-wide component		
Date of EC–UNEP agreement signature	15/03/2016		
Project start date	12/04/2016	Project end date	11/04/2019
Overall project duration	36 months		

Responsible entity and branch	UNEP-Africa office
UNEP project manager and email address	Richard MUNANG Richard.Munang@unep.org
EC task manager and email address	Martin KASPAR Martin.KASPAR@ec.europa.eu

[1] Please indicate if this is first or last report, and modify the start or end date accordingly.

[2] Comprises climate modelling institutions - the Energy Research Centre of the Netherlands (ECN), the National Renewable Energy Laboratory (NREL) of the United States and the Centre for Climate Strategies (CCS) of the United States.

[3] *L'Observatoire National sur les Changements Climatiques.*

1. Context and summary of project progress

Context: In incentivizing countries to implement their objectives under the Paris Agreement on climate change as set out in their respective nationally determined contributions (NDCs), this project is supporting countries in establishing an implementation framework that maximizes leading social and economic priorities simultaneously with climate mitigation and resilience building for low-emission development. The framework combines strategic policy planning in respective NDC priority sectors with analytical models that extrapolate the long-term effect of implementing alternate NDC policy decisions. The aim is to provide policymakers with decision-making tools that will enable them to prioritize investment trajectories that simultaneously maximize both the socioeconomic and climate effects of NDC implementation to unlock low-emission development. This is unlike business-as-usual investments that fail to meet this threshold. By this means, private investment in clean business will be attracted and market-driven sustainability will be entrenched in climate actions in Africa.

The project approach is two-fold and comprises two interdependent components:

Component 1 is *LEDS planning and implementation support*, which is being implemented in three countries – Cameroon, Côte d'Ivoire and the Democratic Republic of the Congo. This component involves a ground demonstration to practically illustrate how the implementation of NDCs that target priority areas of clean energy and land-based actions can ensure a country creates social and economic opportunities while meeting its climate objectives and demonstrating low emissions development. This ground action is then used to inform strategic planning and policy processes to ensure the demonstrated paradigm can be applied across the country.

Component 2 is *LEDS modelling support* in all eight project countries – Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo, Ghana, Kenya, Morocco, Mozambique and Zambia. This component is adapting existing modelling tools and modelling teams to construct analytical frameworks that extrapolate the cumulative socioeconomic and carbon emissions effect of alternative investment trajectories in the implementation of NDCs. This will enhance a country's modelling capacity to forecast not only climate but also the socioeconomic impacts of NDCs. It will also inform optimal NDC implementation pathways for transitioning to low-emissions development. The established modelling framework is then integrated into decision-making frameworks of relevant line ministries aligned to the NDC in order to inform these optimal long-term policy options.

By exercising these components, the project is delivering at both operational and strategic levels. First, at the **operational level**, there are ground demonstrations under component 1. These illustrate how the implementation of NDCs targeting leading priority areas of clean energy and land-based actions in agriculture and forestry and their amalgamation can ensure that a country meets leading social and economic priorities of food and livelihood security while simultaneously enhancing the resilience of ecosystems and mitigating carbon to meet climate objectives under the Paris Agreement. Lessons and case studies from the ground demonstrations are compiled to inform policies and plans for scaling this paradigm across the target countries. Second, there is a modelling framework under component 2 comprising relevant software and hardware technologies and a team of modellers who use these technologies to conduct extrapolation. The modelling team extrapolates the impact of alternative policy trajectories in NDC implementation to inform on trajectories that maximize socioeconomic and climate benefits.

At the **strategic level** there is a harmonized policy decision-making structure to bridge ministerial silos and ensure that policies from relevant line ministries are complementary to the simultaneous maximization of the socioeconomic and climate impact of NDC implementation. This is achieved by ensuring that models are integrated into decision processes in respective ministries and that lessons and case studies developed in conducting the ground demonstration are integrated to inform policy and planning in the implementation of NDCs. This is the inter-agency policy task force. Lastly, the above trajectory is then replicated across Africa through training and capacity-building institutional hubs in each of the five geographical regions of the continent.

Summary

Component 1 – LEDS planning support

Ground actions are progressing in the three component 1 and 2 countries.

In **Cameroon**, in line with the NDC priority to increase renewable energy installed capacity and enhance green agro-value chains, feasibility studies have been concluded on four sites. Here pilot actions of greening agro-value chains using clean energy, information and communications technology (ICT) and efficient transport are being undertaken. Specific actions involve linking off-grid micro-hydro plants of up to 30kW and solar plants to various levels of cassava processing and value addition. The cassava products will then be linked to markets and supply chains using mobile apps. A mobile app to facilitate this linkage complete with a payment gateway has already been tested.

The transport aspect will be undertaken in tandem with the policy task force. Here, among actions by the task force, there are policies to harmonize planning in the areas of roads and agriculture among others, to establish development plans where road infrastructure investment prioritizes the

linking of agro-production areas to markets and collection points to improve the quality of roads thereby enhancing transport efficiency.

In **Côte d'Ivoire**, a bio-digester company, *Societé de forage construction-énergie renouvelables et équipements* (SOFCEREQ), and the Africa Business Group, which make fuel briquettes from rice husks, are developing a practical ground intervention in order to transform agricultural (rice) waste into energy with linkages to bio-fertilizer production. This is in line with the priority identified by Côte d'Ivoire for this project.

In the Democratic Republic of the Congo, a preliminary feasibility study on the baseline situation of the country's domestic energy sector and identification of an appropriate site for the ground demonstration was conducted in April. The study was carried out by a multi-disciplinary team led by the Higher Institute of Applied Techniques. Key institutions involved included the Centre for Studies and Research in Renewable Energies; the Centre for Adaptation and Integrated Rural Development, the National Centre for Energy at the Department of Energy and Hydraulic Resources, and the University of Kinshasa. Based on this study, North Kivu district was shortlisted as the site of demonstration work, given its proximity to adequate agricultural waste sites for making briquettes. Briquettes are the key waste to energy technology to be demonstrated. A decision on the location and substance of activities will be taken by the team once they conclude studies currently under way – tentatively by the end of October.

Component 2 – LEDS modelling support

Modelling teams have been constituted in the eight countries, drawing technical stakeholders from key economic sectors – primarily those of energy, agriculture, economic planning and the climate sectors of environment and forestry. In each of the countries, reputable regional institutions are leading their modelling teams. For instance, in Cameroon, the University of Yaoundé 1 is the lead. In Mozambique, the Faculty of Agriculture and Forestry of the Eduardo Mondlane University is the lead. In Zambia, the Zambia Meteorological Department, under the Ministry of Transport and Communication, is the lead.

Inventories of existing greenhouse gas emission models have been analysed by country teams to establish the gaps that need to be bridged in order to enhance their capability to model the cumulative effect of integrating sectors and, at the same time, the socioeconomic and climate impacts. This adds value, given that current models in countries only cover emissions without the critical socioeconomic aspect.

In **Cameroon**, four models – Regional Economic Models, Inc., (REMI), the Regional Input-Output Modelling Systems (RIMS II), the Jobs and Economic Development Impact (JEDI), and Impact Analysis for Planning (IMPLAN), have been shortlisted for enhancement. The enhancement involves

integrating these models to complement one another for policy-decision support to maximize job creation, income and macroeconomic growth, alongside carbon mitigation impacts of an investment trajectory that scales up green agro-value chains and harnesses clean energy for processing and transportation. The enhanced model to be used by policy decision-makers will start off with the cassava value chain demonstrated under component 1 but will factor in flexibility for expansion to cover leading crop value chains for all five agriculture production regions of Cameroon.

In **Côte d'Ivoire**, a total of 33 inventoried models were evaluated. Two models – LEAD and T21 – are being developed into an integrated modelling tool to extrapolate cumulative socioeconomic and carbon-mitigating or climate impacts of policies upscaling the chosen country's NDC priorities. Training on the EX-Ante carbon-balance tool and EX-ACT value chain were also undertaken through collaboration with the bioenergy project of the Food and Agriculture Organization of the United Nations (FAO), in order to create the potential of integrating these into the model. These priorities depict an environmentally sustainable agriculture industry with the flexibility to factor in future developments as the country evolves to higher levels of industrialization.

In **the Democratic Republic of the Congo**, a modelling team has been established and supported to evaluate the country's greenhouse gas emissions models inventory towards shortlisting appropriate models for enhancement.

The international technical team[2] has been linked up with the country modelling teams and the process of analysing gaps that must be bridged by adapting models, and the training of modelling teams which will set in place the country modelling structure has been launched. The United States of America Centre for Climate Strategies (CCS) is technically backstopping country teams in Cameroon, Côte d'Ivoire and the Democratic Republic of the Congo. The National Renewable Energy Laboratory (NREL) is technically backstopping Kenya, Morocco and Zambia. The Energy Research Centre of the Netherlands (ECN) is backstopping Ghana and Mozambique.

At the policy level, policy task forces hosted by ministries of environment have been established and are awaiting gazetting in order to be a permanent feature for the implementation of NDCs. These task forces will be responsible for policy harmonization in all the eight countries.

[2] Comprises climate modelling institutions - the Energy Research Centre of the Netherlands (ECN), the National Renewable Energy Laboratory (NREL) of the United States and the Centre for Climate Strategies (CCS) of the United States.

Regional peer-to-peer learning

To facilitate the upscaling of this trajectory, modelling research institutions – the University of Yaoundé 1 in Cameroon; the University of Eduardo Mondlane in Mozambique; the Centre for Energy, Environment and Engineering in Zambia – that, among other initiatives, are currently engaged in modelling actions in these countries will form peer-to-peer learning forums with their network of institutions. This will help infuse lessons into curriculum and research work and disseminate these lessons across the continent.

2. Detailed progress

The Africa LEDS project is on track to support the establishment of an enabling framework for NDCs implementation in target countries. The envisaged framework combines relevant policy planning, coupled with analytical technical, technological and tactical capacity to ensure implementation that maximizes a country's socioeconomic development priorities together with such climate objectives as limiting greenhouse gas emissions, as called for in the Paris Agreement. This is a break from classical approaches centred on emissions reduction only. Policy task forces whose function is to bridge ministerial silos for harmonized policies are being formalized in countries. These task forces are planned as a permanent feature of policymaking. Models and modelling teams to inform policy decisions in the above trajectory are being established and adapted.

To ensure that this paradigm of maximizing both socioeconomic and climate impacts of NDCs implementation is catalysed across the continent, institutions of regional standing that are currently leading the modelling teams will be engaged as regional hubs and centres of excellence to lead in disseminating the NDC implementation trajectory across Africa.

2.1 Component 1: LEDS planning and implementation support

Executing a ground demonstration pilot is the leading activity. It entails building on already established sectoral initiatives and linking them for consolidation into a single pilot ground action that demonstrates how NDC implementation can maximize socioeconomic and climate mitigation impacts simultaneously by following on the chosen strategic development trajectory in each country.

2.1.1 Cameroon

Key accomplishments in Cameroon

In Cameroon, the ground demonstration is focused on linking or integrating specific clean energy technologies (solar and micro-hydro) prioritized in the country's NDCs to power value addition and the processing of specific crop value chains with the aim of achieving the greening of agriculture, as called for in the NDCs. Stakeholders have selected cassava as the flagship crop. The aim is to demonstrate in practice how NDC priorities can be integrated for complementarity and synergy with the aim of maximizing both the climate and socioeconomic impacts of these priorities against business-as-usual scenarios, where these are developed in silos and the socioeconomic impacts are

not factored. From this ground action, case studies will be developed to guide policy processes for replication across Cameroon.

The demonstrated action will also be modelled under component 2 to provide an analytical tool that can extrapolate the long-term socioeconomic (for example jobs created, percentage of GDP expansion, and income savings) and climate (for example carbon sinks enhanced, carbon sequestered, ecosystems enhanced) impacts of various levels of investments scaling the demonstrated low emissions trajectory in relation to alternative and business-as-usual investment scenarios. These will then inform planning decisions on energy investments (decentralized solar and micro-hydro) and green agriculture, as called for in the NDCs, to ensure that complementarity is achieved with a view to maximizing the climate and socioeconomic impacts of such investments.

A. Policy task force: A task force has been established bringing together the relevant sectoral ministries of agriculture, communication, energy, environment, finance, forestry, and planning, among others. The main purpose of this task force is to lead in cross-ministerial policy and institutional harmonization and the integration of LEDS modelling into decision processes of relevant line ministries, with a view to ensuring the wide-scale delivery of the Cameroon priority. The task force is serving both components 1 and 2.

To ensure sustainability, the Minister of Environment, Protection of Nature and Sustainable Development signed letters appointing these focal technical and policy persons drawn from relevant ministries to participate in the interministerial policy task force. The terms of reference of the task force have been finalized.

B. Demonstration pilot action to inform policy: based on recommendations from the Project Steering Committee, country stakeholders settled on the cassava value chain as the focus for the ground activity. The criteria used were that cassava is a high-value, climate-resilient crop value chain that encapsulates both socioeconomic and climate resilience objectives of this project in Cameroon. In addition, stakeholders noted that a number of stakeholders are engaged in the cassava value chain and this will ensure adequate site-based initiatives are available for the project to build on.

Consequently, the demonstration action has started and involves linking farm-level sustainable production of cassava using ecosystem-based adaptation approaches known to restore ecosystems, for example that of agroforestry (which has additional benefits enhancing forest sinks and reversing degradation) to clean energy to power value addition and linkage to markets using efficient transport networks (policy level) and access to market and supply chain information using ICT.

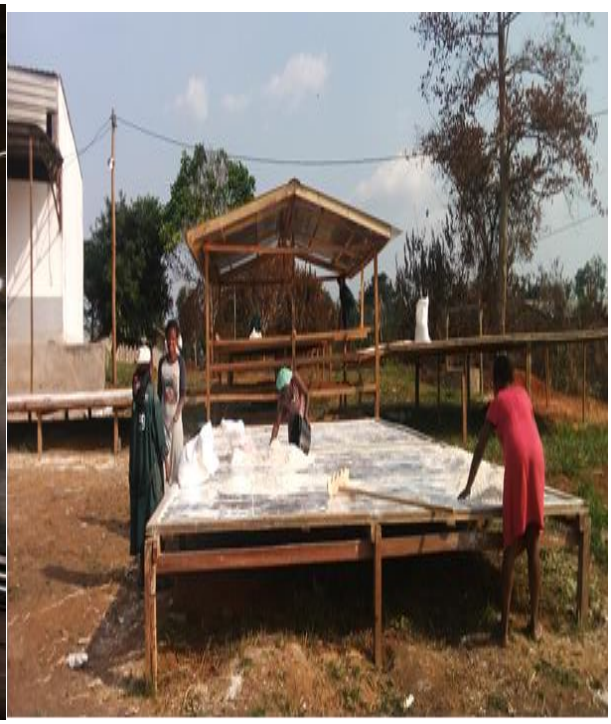
C. Feasibility studies for demonstration site selection: feasibility studies were conducted in 12 sites representing all the five agriculture regions of Cameroon. The selection of sites was primarily based on the existence of relevant ongoing ground actions that this project can build on to minimize cost and operational risks. These are: Yoko and Ngaounderé 2 (Guinean savanna zone); Yagoua and Kaélé (Sudano-Sahelian zone); Yoko, Ngoulemakong and Nkolafamba (forest zone); Dschang and Jakiri (mountain grassfield area); Douala VI-Massoumbou and Bakassi (coastal zone). Studies are near completion and three sites have been shortlisted for potential development into integrated cassava processing zones with ICT linkages to markets and supply chains as an integrated demonstration of how LEDS can simultaneously mitigate carbon, enhance ecosystems and create socioeconomic opportunities, as outlined below:

(a) Jakiri council site with a 30kw micro-hydro power plant, to be linked to a 3ha cassava farm with ongoing plans to mobilize a processing unit. This site will be linked to markets and supply chains through the AfroShop mobile app;

(b) Ngoulmakong council site, where a cassava processing plant run by the farmers' cooperative currently powered through the main grid is to be substituted by a decentralized solar plant of over 1Kw capacity. This site will be supplied by a 50ha cassava farm and linked to markets and supply chains through AfroShop mobile app;

(c) Yoko council site, which will be built into a solar mini-grid-powered processor of cassava with AfroShop used to link the site to markets and supply chains. The site will build on and aggregate existing initiatives in the area – a food processing plant, a solar plant and get cassava supplies from select cassava farmers in the area.

Local political support is secured in the above councils for these undertakings as project activities registered with the mayors' offices to safeguard the sustainability of actions.



Left: **Site 1** – Jakiri council site where an existing micro-hydro power plant of 30 KW will be linked to power cassava processing plants in the Jakiri municipality.

Right: **Site 2** – Cassava solar drying will be implemented in the Ngoulemakong council site to replace grid-connected drying processes and to reduce the processing operations costs for farmers.

Site 3: solar mini-grid plant that can power various levels of cassava processing to be linked to power cassava processing from nearby farmer cooperatives in the Yoko council site.

D. Demonstration activity implementation team

Implementation teams for activities in the four key pillars of the demonstration activity have been established:

- Policy actors sensitized and mobilized from priority ministries of energy, agriculture, forestry and transport to establish the interministerial policy task force hosted by the Ministry of Environment. Nominees awaiting formalization of the task-force to be a permanent feature of policymaking in Cameroon.
- Decentralized clean energy power generators (Jakiri council micro hydro, Yoko council solar plant) and two cassava processing units in Dschang council with a wind plant and cassava processing enterprise mobilized.
- ICT team for efficient linkages to markets and supply chain information, led by the University of Yaoundé 1 – a mobile app called AfroShop developed by University of Yaoundé students already established and tested.

E. Country project management team

A team has been established and coordinated by the Ministry of Environment, Protection of Nature and Sustainable Development as the lead in policy linkages; the National Observatory on Climate Change,,[3] a government technical agency, has been designated as the lead technical actor and Action for Equitable, Integrated and Sustainable Development as the lead in operations.

F. Next steps

The following measures are envisaged:

Operationalizing at least one demonstration site among the shortlisted sites by consolidating the clean energy, processing plants and farms into one demonstration exemplifying the prioritized trajectory of greening agro-value chains using clean energy. At the Jakiri site, the project is expected to link existing micro hydro to power cassava processing. At the Ngoulemakong site, the project is expected to link cassava farms to solar dryers. Progress to be monitored and evaluated;

Conducting meetings of the policy task force to measure demonstration progress and amend relevant policies;

Documenting the case studies which are being implemented in the demonstration site.

[3] *L'Observatoire National sur les Changements Climatiques.*

2.1.2 Côte d'Ivoire

In Côte d'Ivoire, the target low-emissions development trajectory being demonstrated is waste-to-energy and bio-fertilizer conversion, designed to mitigate emissions from energy, agriculture and waste while simultaneously creating income opportunities. The demonstrations piloted in two sites will involve the construction and rehabilitation of existing communal biogas plants to run on rice-waste as a feedstock. The slurry from this plant will be converted to bio-fertilizer. It will also involve using a nearby briquettes business to make fuel briquettes from rice waste.

Business plans for briquettes, biofertilizer and clean cook-stoves will also be developed to catalyse enterprises. Biofertilizer use is expected to mitigate emissions and to lower farmers' fertilizer costs thereby boosting profitability – relative to synthetic fertilizer, which has a bigger carbon print and costs more. It is also expected to catalyse the organic fertilizer businesses. Biogas and briquettes are expected to mitigate emissions associated with charcoal and kerosene, and lower domestic fuel costs to improve household level savings. It is also expected to catalyse the creation of clean cook-stove related enterprises. This demonstration will demonstrate in practice how the NDC priorities of Côte d'Ivoire can be integrated for complementarity and synergy with a view to maximizing both their climate and socioeconomic impacts.

Key accomplishments in Côte d'Ivoire

A. Policy task force: Following the governmental restructuring, policy task force membership has been established to lead in cross-ministerial policy and institutional harmonization and integration of LEDS modelling into the decision processes of relevant line ministries, with a view to promoting the wide-scale delivery of the Côte d'Ivoire priority. Key policy members are drawn from the Ministry of Planning and Development, Ministry of Petroleum, Energy and Promotion of Renewable Energies, Ministry of Water and Forests, Ministry of Animal and Fishery Resources, and the Ministry of Agriculture and Rural Development. In addition, members come from the Directorate of Strategy, Planning and Statistics of the Ministry of Environment and Sustainable Development, the Côte d'Ivoire anti-pollution centre under that Ministry, the National Agency for Rural Development Support (ANADER), a technical government agency under the Ministry of Agriculture, and other bodies. The task force, which is chaired by the Prime Minister's office with a deputy chair from the Ministry of Planning, serves both components 1 and 2.

B. Demonstration pilot action to inform policy: based on the Project Steering Committee, Côte d'Ivoire's demonstration has started and involves linking agriculture waste to domestic level clean energy (biogas and briquettes) and organic fertilizer production (biofertilizer) as a climate-smart agricultural production activity.

Demonstration activity implementation team

An implementation team has been established, with the following composition:

(a) ANADER, under the Ministry of Agriculture and Rural Development, is the lead ground implementing agency while the Ministry of Environment and Sustainable Development is the lead coordinating ministry;

(b) Ongoing initiatives on bio-energy by FAO, SOFCEREQ[4] and the secretariat of the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing countries (UN-REDD_ Programme)[5] within the Ministry of Environment and Sustainable Development have been established as ground actions that the project will build on for the bio-energy and biofertilizer demonstration work.

C. Feasibility studies for demonstration site selection: Ministry of Environment and Sustainable Development, in conjunction with ANADER, the FAO planned climate-smart agriculture and bioenergy project, the REDD+ secretariat and SOFCEREQ have conducted feasibility studies to establish appropriate site and implementation partners.

Accordingly, the project is focusing on the rice value chain in Gagnoa city – specifically, in the villages of Tipadipa and Tietiekou. **Biogas** and **briquette** production are the key waste-to-energy technologies that the project will focus on. The fuel developed will be used for cooking by partnering social institutions, businesses and households to demonstrate how a shift to biogas and briquettes saves fuel costs, thereby improving profitability and savings in addition to mitigating emissions.

Two sites, one in Tipadipa village (50 ha rice field) and another in Tietiekou village (50 ha rice field) for rice waste collection have been identified and questionnaires circulated to farmers for data collection on waste generation trends (rice straw). Villages have also expressed interest in housing the biogas plant.

A waste-to-energy plant (converting rice waste to briquettes) to complement the project has been established in Tietiekou. This will be a site for a waste-to-energy plant (briquettes) demonstration for the project.

[4] http://www.sofcereq.ci/.

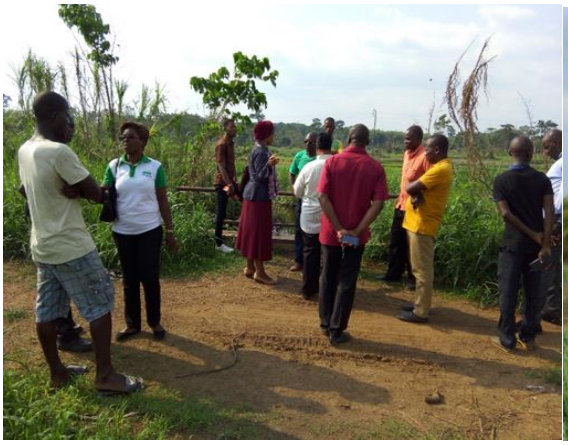
5 "Développement d'une stratégie énergétique domestique basé sur la valorisation de la biomasse et les énergies renouvelables ", a project on reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+) will be specifically involved.

A local enterprise, the Africa Business Group, which makes fuel briquettes will work in partnership with the projects to convert rice husks, from identified farmers, to briquettes. The enterprise will develop business plans and a social marketing strategy to catalyse the emergence of enterprises around the waste-to-energy products demonstrated.

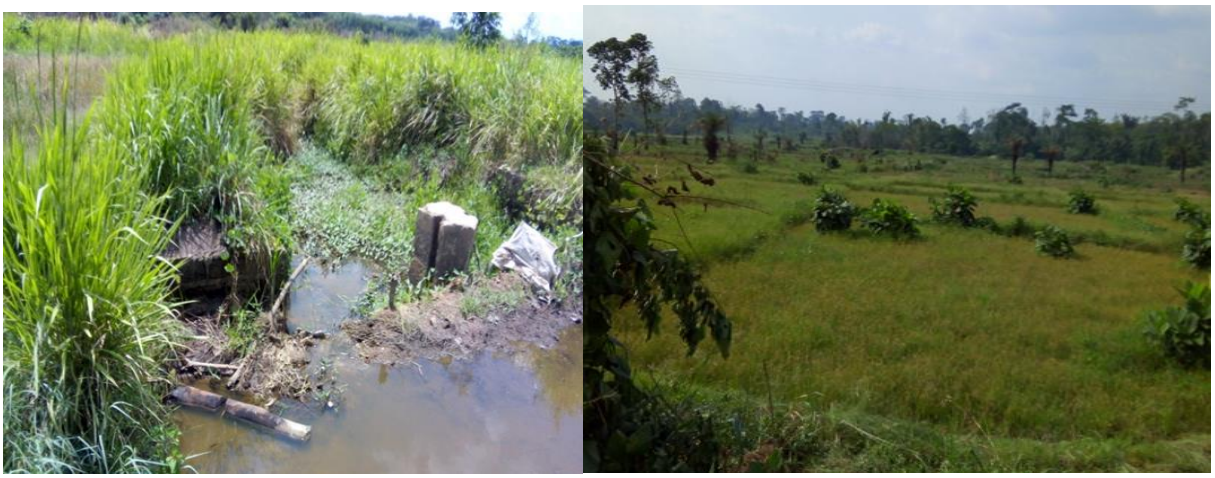
In order to extract biogas from rice-waste, meetings have been held in Tipadipa with the heads of schools and health centres to discuss the location of biogas plants to replace firewood and charcoal burners. They have included the following activities:

- Visiting the various potential sites for the installation of a biogas production unit.
- Selecting two sites located near primary school 1.
- Collecting information to define the installation of the biogas plant.
- Bio-digester company SOFCEREQ to develop a biogas plant to transform agriculture (rice) waste to energy with linkages to bio-fertilizer production. This is to fulfil the prioritized trajectory of climate-smart agricultural production.

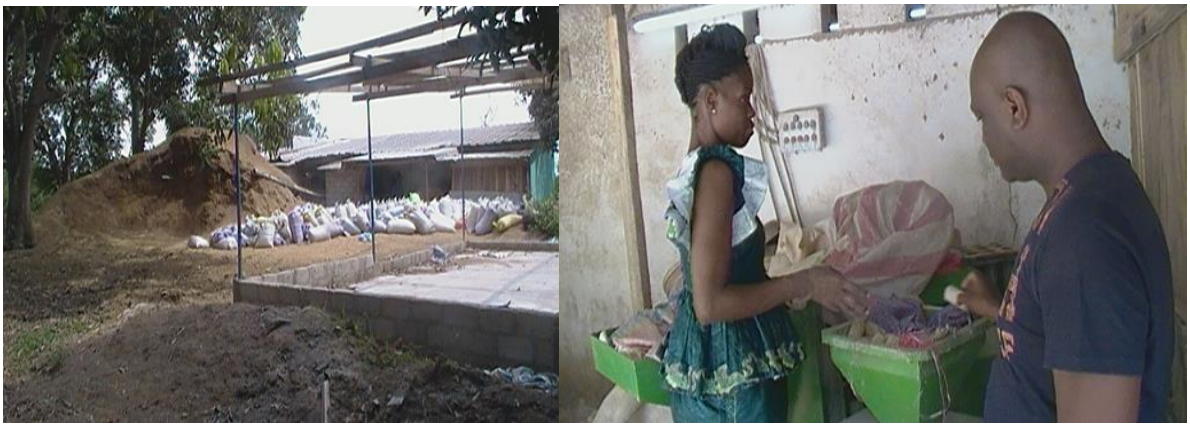
To consolidate synergy with the FAO project, a joint capacity-building workshop for rice farmers engaged in both the FAO and the Africa LEDS project was undertaken. The workshop focused on sustainable rice development strategies and bioenergy development at local levels.

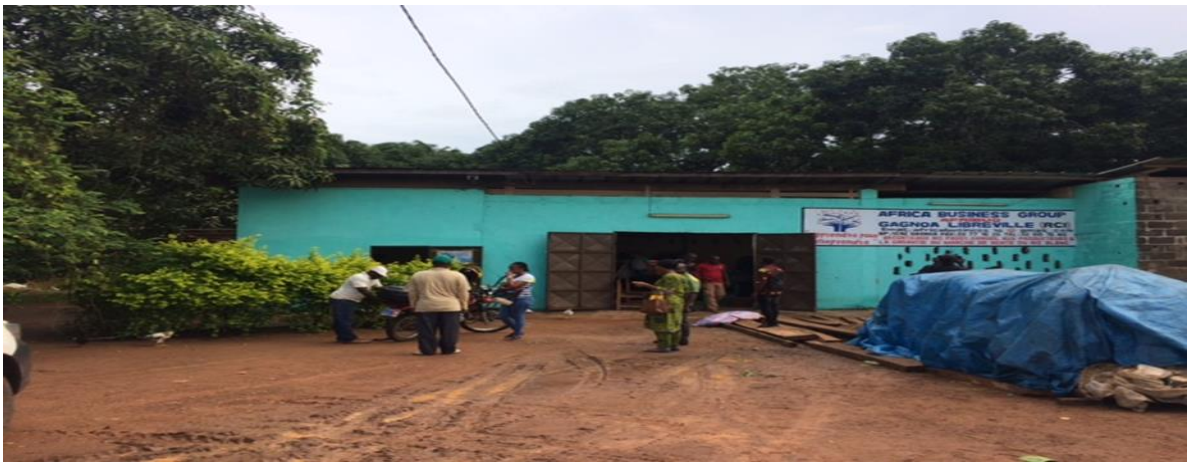


Site 1: Rice production sites in Tietiekou village, Gagnoa city

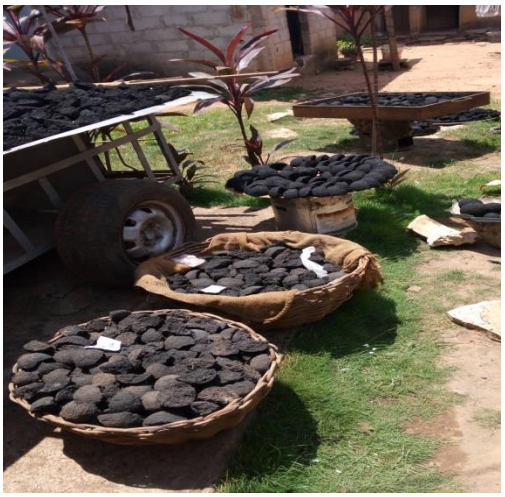


Site 2: – Rice production sites in Tipadipa village, Gagnoa city





Site 3: Waste-to-energy unit run by the Africa Business Group to produce briquettes from the rice waste of target farmers and then to market them – Tietiekou, Gagnoa city.



Final product – sample rice waste briquettes to be produced and marketed by the Africa Business Group

D. Country project coordination team: The team has been established and is coordinated by the Ministry of Environment and Sustainable Development. The team draws membership from those involved the ground demonstrations (ANADER and the UN-REDD Programme secretariat), modelling stakeholders drawn from governments, universities and research institutions and the Côte d'Ivoire NDCs coordinator. This team serves both component 1 and 2.

E. Next steps

The following measures are envisaged:

- To operationalize demonstration sites and to monitor and evaluate progress.
- To conduct meetings of the policy task force with a view to compiling demonstration progress and amending relevant policies.
- To compile case studies based on the demonstration site.

2.1.3 Democratic Republic of the Congo

The demonstration focuses on waste-to-energy and biofertilizer with linkages to consolidate the REDD+ process in the Democratic Republic of the Congo. This responds to leading NDC priorities in the country of waste to energy, forest management, sustainable agriculture and scaling clean energy by integrating them for complementarity. The REDD+ component is critical, considering that the Democratic Republic of the Congo holds Africa's largest and the world's second largest rainforest, storing 25–30 billion tons of carbon. This is under heavy threat, since biomass is the

source of fuel for 94 per cent of the population of the Democratic Republic of the Congo and creates income opportunities through harvesting up to 490,000 tons of charcoal annually.

Through this project, a trajectory of alternative domestic fuel and livelihood opportunities in briquettes and organic fertilizer production will be established to forestall forest degradation. A site in North Kivu district has been shortlisted to build on existing briquette enterprises by including a component for the use of agricultural and household waste and additional bio-fertilizer products. Agriculture and household waste will be the raw material used to produce the briquettes and biofertilizer to ensure a stronger focus on the waste-to-energy and biofertilizer approach.

Biofertilizer use is expected to mitigate emissions and lower farmer fertilizer costs to improve profitability – relative to synthetic fertilizer, which has a bigger carbon print and higher cost. It is also expected to catalyse organic fertilizer businesses. Briquettes are expected to mitigate emissions associated with forest degradation and catalyse the creation of clean cook-stove related enterprises. This demonstration is exemplifying the practicality of integrating the NDC priorities of the Democratic Republic of the Congo regarding the scaling up of clean energy, waste management, sustainable agriculture and REDD+ for complementarity, so as to maximize both the climate and socioeconomic impacts of these priorities.

The demonstrated action will also be modelled under component 2 to provide an analytical tool that can extrapolate the long-term socioeconomic impact (for example. jobs created, percentage of GDP expansion, and income savings) and the climate impact (carbon sinks enhanced, and carbon sequestered, among other effects) of various levels of investments to scale up the demonstrated low emissions trajectory in relation to business-as-usual investment scenarios. This will inform planning decisions that will ensure that the country's NDCs implementation trajectories maximize both socioeconomic priorities and climate impacts.

Government restructuring has slowed down project activities in the Democratic Republic of the Congo. The accomplishments listed below stand, however:

Key accomplishments in the Democratic Republic of the Congo

- **Policy task force**: A policy task force has been established to lead in cross-ministerial policy and institutional harmonization and in the integration of LEDS modelling into decision processes of relevant line ministries towards the wide-scale delivery of the main priority of the Democratic Republic of the Congo. The task force draws membership from policy and technical personnel in government agencies under key Ministries – in particular those of the environment, agriculture, energy, planning and finance, rural development, and scientific research; universities and research institutes represented by the University of Kinshasa, the National Pedagogical University, the Higher Institute of Applied Technology,

the Centre for Renewable Energy Studies and Research and the Centre for Adaptation and Integrated Rural Development. The task force serves both components 1 and 2.

- **Demonstration activity**: Demonstration activities have started in the Democratic Republic of the Congo and these involve linking agriculture and other household biodegradable waste to domestic-level clean energy options (such as biogas stoves and briquettes) and organic fertilizer production (biofertilizer). These will complement REDD+ by reducing reliance on biomass. This pilot will provide a base model on how the Democratic Republic of the Congo can transition to sustainable domestic energy options in the diverse agriculture production regions of the country and control deforestation and thus promote the achievement of its NDCs and social and economic priorities.
- **Demonstration activity implementation team**: a multi-disciplinary technical working group has been set up to conduct feasibility studies, design and implement the demonstration activity, under the leadership of the Higher Institute of Applied Techniques. Among key institutions involved are the Centre for Renewable Energies Studies and Research; the Centre for Adaptation and Integrated Rural Development, the National Centre for Energy under the Department of Energy and Hydraulic Resources, the University of Kinshasa, the First Bioresources Development Centre and Green Business, two key non-governmental organizations promoting biogas stoves in the Democratic Republic of the Congo, and the Ministry of Industry, among others.
- **Feasibility studies for demonstration site selection**: the technical working group has conducted a preliminary mapping exercise to establish an appropriate site for a ground demonstration and to identify appropriate actions and technologies already under way that can be built on. Accordingly, North Kivu district has been shortlisted as the likely site of demonstration work, given its proximity to adequate agriculture waste sites and briquette making as among the key technologies to be demonstrated.
- **Country project coordination team**: The Ministry of the Environment and Sustainable Development is the project lead in the country and all work is coordinated by a team at the Ministry led by the Head of Climate Change Division. This team serves both component 1 and 2. At the operational level, the Higher Institute of Applied Techniques is leading the ground demonstration team, which includes national academic and research institutions and also local non-governmental organizations operating in North Kivu – the First Bioresources Development Centre and Green Business. Local households in North Kivu will be used to pilot the effectiveness of demonstrated alternative energy options as means of incentivizing uptake.

Next steps

The following measures are envisaged:

- Finalizing feasibility studies and selecting a site to execute the demonstration pilot.
- Operationalizing the demonstration site and monitoring and evaluating progress.
- Conducting meetings of the policy task force to compile demonstration progress and amend relevant policies.
- Compiling case studies based on the demonstration site.

2.2 Component 2: LEDS modelling support

Modelling: In component 1 countries, the aim is to put in place an analytical framework in the relevant line ministries to inform optimal investment decisions designed to scale up the strategic trajectory of implementing the NDCs demonstrated. The key issue is to ensure that modelling can extrapolate the cumulative carbon mitigation impact/benefits (for example, carbon sinks enhanced, carbon sequestered) and socioeconomic impact/benefit (for example, jobs created, GDP boosted, and income savings generated) of scaling up the chosen trajectory in relation to business-as-usual investment trajectories. Flexibility to factor in future developments as the countries ascend to a higher order industrial growth is also ensured.

Hence progress is reported in two critical areas – establishing the modelling team and adapting models to extrapolate the above outcomes. The task force established under component 1 also serves to integrate adapted models to policy processes in these countries.

In the five component 2-only countries, this component aims to support establishing an analytical policy-decision framework that combines strategic policy planning with analytical modelling to maximize the carbon mitigation, climate and socioeconomic impacts of NDC implementation. This framework is to inform decisions on the carbon mitigation, climate and socioeconomic impact of policy, so as to scale up investments in the chosen project-level priorities in relation to business-as-usual investment trajectories, thereby ensuring NDC implementation maximizes both carbon mitigation and the achievement of the country's socioeconomic priorities.

The analytical policy decision framework has two critical components on which progress will be reported. At the **strategic level,** there is a harmonized policy decision-making structure across relevant line ministries aligned with the narrowed down project priorities in NDC implementation. At the **operational level,** there is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with the relevant technical capacity to deduce the projected impacts of alternative policy trajectories and provide information on optimal trajectories.

Hence progress is reported in two critical output areas.

The first is the policy level, where progress in establishing the policy task force to mobilize policy makers from relevant line ministries aligned with the respective country project level priorities is the key deliverable. The work assigned to the task force is to convene these line ministries to harmonize their policies and integrate the models into their decision processes;

The second is the operational level, where progress in establishing the modelling team and relevant modelling tools to determine the cumulative carbon mitigated and socioeconomic impacts of scaling chosen project priorities in NDCs implementation is the required output.

The following section reviews the progress, with a view to establishing these policy decision frameworks in the eight countries in question.

2.2.1 Component 1 and 2 countries

2.2.1.1 Cameroon

The aim is to establish an analytical decision framework that can project the cumulative socioeconomic and carbon mitigating and climate impact of scaling up Cameroon's chosen priority of greening agro-value chains harnessing clean energy for processing and transportation.

Key actions in this domain include the constitution of the modelling team and inventorying the current models in use with the objective of establishing the capacity baseline. Based on this background, a gap analysis is then undertaken, covering:

- Gaps in the technological capabilities of the current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the strategic trajectory for Cameroon also demonstrated under component 1. This trajectory covers the integration of on-farm ecosystem-based adaptation production of cassava with clean energy to fuel various levels of value addition, and the linking of these to ICT for efficient market and supply chain access and efficient, low-carbon transport linkages. These then provide flexibility for expansion to cover all the five agriculture production regions of Cameroon.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory above.

Based on the above gaps, the identified gaps are bridged and the analytical decision framework established. This is achieved through a series of capacity-building actions, including webinars, the hands-on adapting and testing of models, the transfer of relevant technologies and training and demonstration workshops.

All the above are guided by the need to provide models that can extrapolate the cumulative carbon mitigation and climate impact (for example carbon sinks enhanced, carbon sequestered) and the socioeconomic impact (jobs created, GDP boosted, and income savings generated, among others) of various policy options scaling up investment in the chosen NDCs implementation trajectory of the delivery of technical and political capacities in developing green agro-value chains harnessing clean energy for processing and transportation in relation to business-as-usual investment trajectories.

Key accomplishments in Cameroon

A modelling team has been established comprising a technical modelling unit, technical secretariat and a supervisory team. The technical modelling unit draws experts from energy and transport (Ministry of Energy, Ministry of Transport; universities – Department of Mechanical and Industrial Engineering, University of Yaoundé I; practising consultants in greenhouse gas (GHG) inventories, GHG emissions trends, GHG emissions projections); agriculture (Ministry of Agriculture; universities – University of Yaoundé I, Dschang University; non-governmental organizations); forests (Ministry of Forests and Wildlife; universities – University of Yaoundé I; practicing consultants in forestry and REDD+; technical government climate change agency – the National Observatory on Climate Change); and ICT experts in modelling sectors of agriculture, energy and transport and in consolidating models.

The technical secretariat which validates actions of the modelling unit for integration into policy processes comprises modelling experts drawn from the Ministry of Environment, which is the ministry that coordinates the participation of all other ministries, and a consultant in developing decentralized renewable energy in the Cameroon context.

The supervisory team which oversees all modelling work comprises representatives from the Ministry of Environment as the coordinating ministry, the National Observatory on Climate Change as a lead government technical agency and the non-governmental organization, Action for Equitable, Integrated and Sustainable Development, as the lead organization coordinating operational aspects of the project.

The inventory of models currently in use in Cameroon is evaluated. Specific models are shortlisted for their further transformation into integrated models that can forecast or extrapolate the carbon mitigation impacts (for example carbon sinks enhanced, carbon sequestered) and the socioeconomic impacts (jobs created, GDP boosted expansion, and income savings generated, among other effects) of various policy options to scale up investment in the chosen strategic trajectory.

Shortlisted models for the extrapolation of socioeconomic parameters:

(a) Impact Analysis for Planning (IMPLAN) – divides an economy into hundreds of sectors and allows a user to define the expenditure allocations associated with a given expansion in demand to all relevant parts of the economy in order to assess the economic impacts of the demand expansion [http://implan.com/V4/index.php?option=com_content&view=frontpage&Itemid=70];

(b) Jobs and Economic Development Impact (JEDI) – models use project-specific data to estimate gross jobs, earnings and other economic outputs (http://www.nrel.gov/analysis/jedi/about_jedi.html);

(c) Regional Input-Output Modelling System (RIMS II) – provides users with multipliers for output, earnings, employment and direct-effect multipliers for earnings and employment [https://www.bea.gov/regional/rims/rimsii/rimsmaint.htm].

(d) Regional Economic Models, Inc. (REMI) models – forecast the net economic impacts of investment trajectories at a regional scale [http://www.remi.com/products].

Shortlisting is in progress for carbon-mitigating and climate models where the Global Biosphere Management (GLOBIOM) model used to forecast carbon mitigation in REDD+ and the Model for Energy Supply Strategy Alternatives and their General Environmental Impact (MESSAGE) model relating to energy demand and supply are among those in use in Cameroon.

These models will be linked to complement one another in forecasting job creation, income and macroeconomic growth, alongside carbon mitigation and climate impacts of alternative policy options to scale investments in the chosen trajectory of green agro-value chains harnessing clean energy for processing and transportation.

Gap analysis is under way with the following accomplishments:

- Definition of the modelling option for Cameroon – construction of the model will be by phases: the first phase will involve building sectoral models. The second phase will involve consolidating them into a global model.

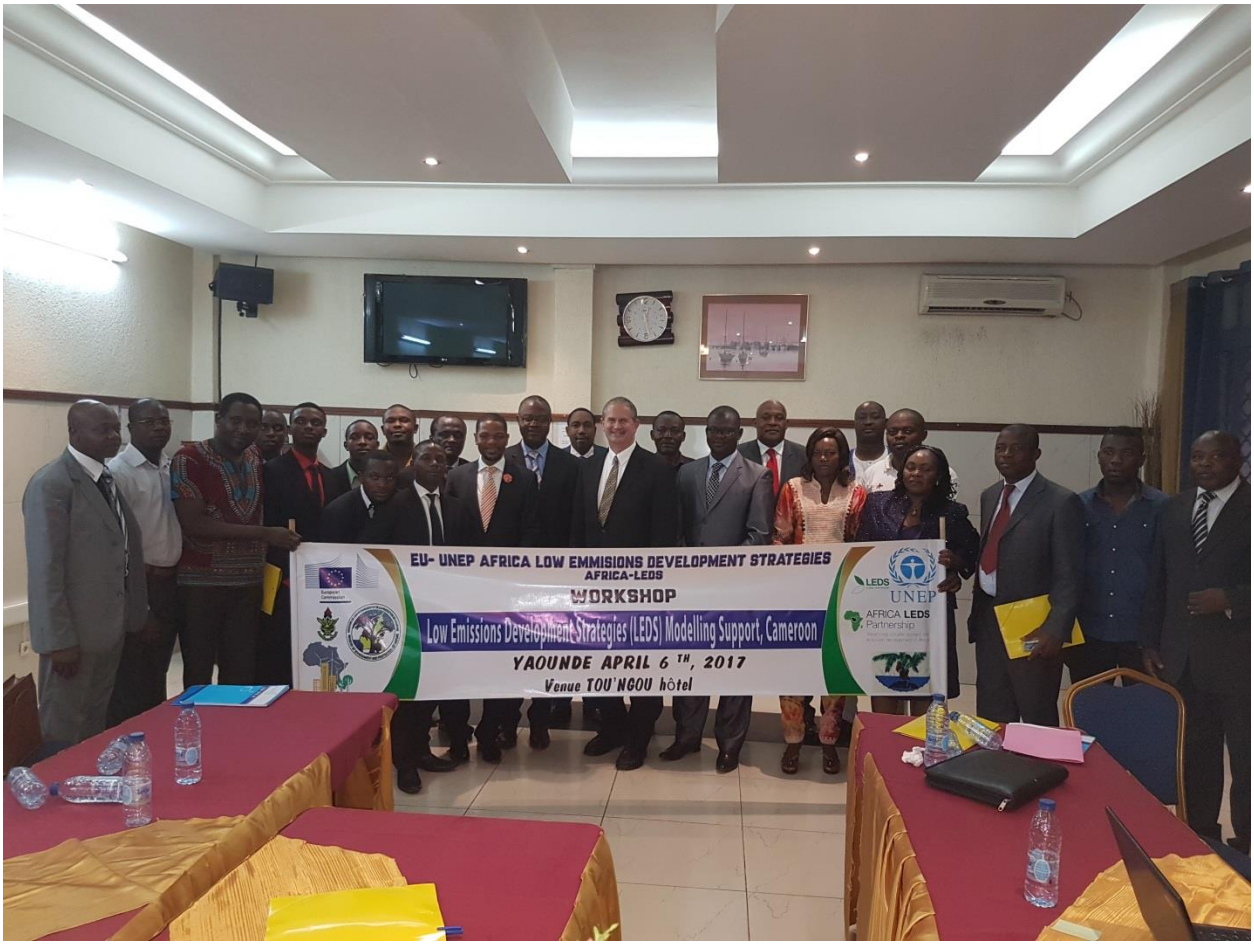
Sectoral data collection activities are under way for agriculture, transport, energy and forestry. Experts from priority ministries are leading the data collection in coordination with the modelling team to guarantee an acceptable quality of data. Modelling team capacity-building is under way:

- Internally – a capacity-building workshop on the basic principles of modelling in relation to the component 2 modelling held on 22 May, 2017; International Atomic Energy Agency (IAEA) training programme on the MESSAGE model that models energy demand and supply, as well as energy emissions.

- Externally – planning complete for the first webinar by the project technical partners Centre for Climate Strategies (CCS), United States.

The Cameroon modelling team is linked to the project technical team led by CCS for specific capacity-building actions – including webinars, hands-on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

CCS has developed an operational plan on accomplishing the capacity-building actions above.



***In pictures**: Cameroon focus group discussion/scoping meeting*

Next steps

The following measures are envisaged:

- Finalizing the gap analysis.
- CCS technical focal point to launch remote support (webinar) to the Cameroon modelling team and to guide processes of establishing a project-level baseline in chosen priority sectors of agriculture and energy with linkages to transport, which will feed into the models to inform extrapolations of various policy options. On energy, the project-level baseline will focus on off-grid solar, micro-hydro and wind energy installed capacity. On agriculture, the project-level baseline will focus on cassava value chains. An amalgamation of the two will focus on the cumulative impact, in other words, the social and economic indicators such as jobs created, income increases or cost savings, percentage increase in GDP in relation to carbon mitigated by alternative investments in solar, wind or micro-hydro powered value addition processes in the cassava value chain. This should also be adaptable for crop value chains in the five agricultural production regions of Cameroon to take into account the green diversity of the country.
- In the area of transport, models will inform on the socioeconomic impact in terms of transport cost savings, revenue increases, the percentage of GDP contributed by alternative investment in efficient roads networks linking each of the five agriculture production regions to collection points and markets.
- CCS technical focal point to lead the Cameroon modelling team in customizing and adapting relevant models compatible with the current modelling process in Cameroon.
- CSS to undertake a training workshop on the use of adapted models and conduct simulations with the Cameroon technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- Working with the policy task force to transfer and install relevant models into decision structures of the relevant line ministries.

2.2.1.2 Côte d'Ivoire

The demonstrated action under component 1 will also be modelled under component 2 to provide an analytical tool that can estimate the long-term socioeconomic impact (for example. jobs created, GDP boosted, and income savings generated) and climate impact (carbon sinks enhanced, carbon sequestered, and ecosystems enhanced, among other effects) of various levels of investments scaling up the demonstrated low emissions trajectory in relation to business-as-usual investment scenarios. This will inform planning decisions that will ensure that Côte d'Ivoire's NDCs implementation trajectories maximize both socioeconomic priorities and climate impacts.

The aim is to establish an analytical decision framework that can forecast the cumulative socioeconomic and carbon mitigation and climate impact of scaling up the strategic trajectory in Côte d'Ivoire in relation to business-as-usual investment trajectories. The strategic trajectory is developing *compost production to support smart agriculture industry pathway and reduce GHG emission from both the waste and agriculture sectors while simultaneously creating jobs* demonstrated under component 1 with the flexibility to factor in future developments as the country develops to higher order levels of industrialization. This implies a two-track approach:

First, based on the current level of development, the models should be able to extrapolate the carbon-mitigation and socioeconomic impacts to be realized by an investment trajectory scaling up agricultural waste (rice waste) to domestic energy (biogas production and use) and biofertilizer production in relation to a business-as-usual scenario of upscaling biomass/kerosene-based domestic energy use and importation of synthetic fertilizer.

Second, in factoring in flexibility to cover future developments as the country develops to higher order levels of industrialization, models should extrapolate carbon mitigation, ecosystems protection and socioeconomic opportunities generated by an investment trajectory to up-scale large scale and industrial level waste-to-energy plants in relation to business-as-usual or alternative investments in competing energy sources like coal (increased emissions) or nuclear energy (potentially destroy ecosystems).

To this end, key background actions are being carried out by the modelling team and inventories prepared of the current models in use with the objective of establishing the technical and technological capacity baselines, respectively. Then, based on this background, a gap analysis is undertaken, covering:

- Gaps in the technological capabilities of the current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the strategic trajectory for Côte d'Ivoire.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory.

Based on the above gaps, work will take place with the project technical team to bridge identified gaps and establish the analytical decision framework. This will take place through a series of capacity-building actions – including webinars, hands-on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

Key activities accomplished in Côte d'Ivoire

After the modelling scoping mission on 27 April 2017, the country technical modelling team was constituted and confirmed. The team led by the Atmospheric Physics and Fluid Mechanics Laboratory consists of members drawn from universities and research institutes, technical experts from government ministries or policymakers involved with delivering Côte d'Ivoire's strategic priorities – such as the Ministries of Planning and Development; of Petroleum, Energy and Promotion of Renewable Energies; of Water and Forests; of Animal and Fishery Resources; of Agriculture and Rural Development, and of Environment and Sustainable Development, represented by the Côte d'Ivoire anti-pollution centre and the Directorate of Climate Change and the National Agency for Rural Development Support (ANADER), a technical government agency under the Ministry of Agriculture .

An inventory of the models currently in use in Côte d'Ivoire was evaluated. In all, 33 models were evaluated and two models – LEAD (modelling software for energy planning and GHG mitigation assessment) and T21 (a simulation model for integrated planning) – the EX-Ante Carbon-balance Tool, and the EX-ACT Value Chain shortlisted for further combinations and adaptation into an integrated modelling tool to extrapolate or forecast cumulative socioeconomic and carbon mitigation and climate impacts of policies scaling up the chosen country NDC implementation strategic trajectory priorities for Côte d'Ivoire. An in-depth gap analysis to bridge gaps in these models is currently under way.

Modelling team capacity-building has been launched. The Côte d'Ivoire modelling team linked up with the project technical team from the Centre for Climate Strategies (CCS), United States. The first webinar capacity-building session was undertaken (31 July 2017), resulting in the development of a modelling operational plan.

Internally, through collaboration with the FAO bio-energy project, the modelling technical team was trained on the EX-Ante Carbon-balance Tool and EX-ACT Value Chain modelling tools. These estimate environmental and socioeconomic performance in terms of GHG emissions, climate resilience and the income impact of agricultural and forestry development projects. These models could be combined to estimate the impact of scaling waste to energy and waste to bio-fertilizer as a means of reducing emissions from forest degradation and agriculture against the socioeconomic benefits.

***In pictures**: Côte d'Ivoire modelling team after working session evaluating modelling inventory.*

Next steps

The following measures are envisaged:

- Finalizing gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in the context of modelling or extrapolating the chosen strategic trajectory – both carbon mitigation and climate impacts and socioeconomic parameters) and technological (models in use in relation to the technological capabilities needed to extrapolate carbon mitigation and climate impacts and socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to bridge to upgrade the Côte d'Ivoire strategic trajectory with flexibility for future expansion as described earlier.
- CCS technical focal point to launch a second round of webinars for the Côte d'Ivoire modelling team and to guide the process of bridging the above gaps.
- CCS technical focal point to lead the Côte d'Ivoire modelling team in customizing and adapting relevant models compatible with the current modelling progress in Côte d'Ivoire. This means the shortlisted models to be built up into a derivative model that can forecast or extrapolate the chosen strategic trajectory – climate objectives achieved (for example, energy generation carbon mitigated; forest sinks preserved and enhanced) and socioeconomic priorities (jobs created; household income savings generated, among other effects) realized by an investment trajectory of scaling up the select Côte d'Ivoire project level priorities and their amalgamation in relation to the business-as-usual investment scenario.

- CSS to undertake a training workshop on the use of adapted models and to conduct simulations with the Côte d'Ivoire technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- Working with the policy task force to transfer and install relevant models into decision structures of the relevant line ministries.

2.2.1.3 Democratic Republic of the Congo

Key activities accomplished in the Democratic Republic of the Congo

A technical working group constituting a preliminary modelling team has been established. The team is led by the University of Kinshasa as the lead institution coordinating the modelling and consists of experts drawn from the Government (Ministries of Environment, Agriculture, Forestry, Energy and Planning), the National Statistics Institute, the Central Bank, universities and research institutes, meteorology and remote sensing authorities, among others.

To compensate for the unforeseen delays in the Democratic Republic of the Congo, remote guidance is being provided to country stakeholders as follows:

Establishing a country modelling team – guidance provided on composition and expectations from the modelling team. The key factor emphasized is how to constitute a team capable of modelling the country's chosen priority of *the delivery of energy-efficient household cooking and cook-stove options which will reduce deforestation and consolidate the REDD+ process* in the Democratic Republic of the Congo, to ensure alignment with component 1. Accordingly, the country has constituted a preliminary team consisting of experts in agriculture (especially bio-fertilizer production); renewable energy (clean domestic cooking options – biogas-based cook-stoves etc.) and waste/forest/REDD+ (waste-to-energy conversion – domestic and agriculture waste conversion to biogas etc., saving forest cover and sinks).

Gap analysis – guidance provided on expectations of the gap analysis. Key issues emphasized are the processes and the envisaged end product.

On processes, emphasis is placed on the quality of sectoral data collection and analysis of the technical, tactical and technological gaps to bridge the forecast of the Democratic Republic of the Congo's strategic trajectory.

On the envisaged end product, in alignment with component 1, the country team was advised to collect data that will inform a final product of modelling capacity-building – models and technicians that can forecast the carbon mitigated against income increases, cost savings, jobs created and percentage of GDP contributed or increased by the decision to prioritize investment scaling up the

chosen strategic trajectory. For example, this can be seen when comparing carbon mitigation and climate impacts against income increases, cost savings, jobs created and percentage of GDP contributed or increased by the decision to prioritize investment in biofertilizer production from the slurry of a biogas digester in comparison to business-as-usual scenarios of importation, production and use of synthetic fertilizer.

Consideration may also be given to the carbon offset against income increases, cost savings, jobs created and percentage of GDP contributed or increased by the decision to prioritize investment in production and use of biogas based on both agriculture and domestic waste in households, institutions and catering businesses in relation to the business-as-usual approach of using biomass or firewood and kerosene for cooking in households, institutions and catering establishments.

- The Democratic Republic of the Congo's preliminary modelling team linked up with the project technical team from CCS for remote exchanges in preparation for the first webinar
capacity-building session, an operational plan to guide CCS capacity-building actions was developed.

Next steps

The following measures are envisaged:

Finalizing gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling or extrapolating the chosen strategic trajectory – both carbon mitigation and climate impacts and socioeconomic parameters) and technological (inventory of models in use compared to the technological capabilities needed to extrapolate carbon mitigation and climate impacts and socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to be bridged, with a view to updating the Democratic Republic of the Congo's strategic trajectory with flexibility for future expansion as established at the focus group discussion.

2.3 Component 2-only countries

2.3.1 Kenya

The aim is to establish an analytical decision framework to forecast the cumulative socioeconomic impact (for example, jobs created, GDP boosted, income savings generated, and other effects) and carbon mitigation and climate impact (for example, carbon sinks enhanced, carbon sequestered, and other effects) of implementing Kenya's NDC objectives in relation to business-as-usual investment trajectories. With this information, optimal policy trajectories that can maximize both

climate objectives and socioeconomic priorities simultaneously of NDC implementation can be established.

This framework has two critical components. At the strategic level there is a harmonized policy decision-making structure across relevant line ministries. At the operational level there is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with relevant technical capacity to conduct the extrapolation.

A scoping meeting designed as a focus group discussion was held on 22 February 2017 and a follow-up technical meeting on 2 May, to narrow down NDC priorities and target those most catalytic in order to accelerate achievement of the above. Consequently, Kenya stakeholders prioritized the areas of clean energy and of agriculture, forestry and other land use (AFOLU) at the sector level. These were further refined to the project level, where geothermal and improved cook-stoves were selected under the energy sector and reforestation and agroforestry under the AFOLU area.

These priorities involved the following two-track approach for the modelling actions – covering current and future levels of industrialization and socioeconomic development:

- First, based on current levels of development, modelling actions (in other words the models to be customized and adopted, as well as technical and tactical capacity-building to be done) will put in place an analytical framework to inform carbon-mitigated (forest sinks preserved and enhanced; indoor pollution abated) and socioeconomic priorities to be realized by an investment trajectory of scaling up improved cook-stoves in domestic and commercial uses (for example, catering establishments and small-scale value addition of agro-produce) in relation to a business-as-usual scenario of biomass or kerosene-based cooking facilities. This will cover energy priorities in NDCs reflecting the current level of development in Kenya, where a majority are not connected to the grid and do not use electrified facilities to cook. This will encompass amalgamation with the AFOLU priorities, given the overlaps of biomass energy use with forest depletion, reforestation and agroforestry.

- Second, actions (models and tactical and technical capacity-building) will also be flexible to ensure that they can be expanded for application to reflect future levels of development priorities captured in NDCs as Kenya becomes industrialized with increased industrial level electricity demand. Here, models will inform the carbon mitigated, ecosystems protected and socioeconomic opportunities generated by an investment trajectory to scale up large-scale or industrial-level geothermal power in relation to a business-as-usual scenario or alternative investments in competing energy sources of thermal generators, coal (high emissions) or nuclear energy (potentially destroying ecosystems).

To this end, key background action at a strategic level is constituting the policy task force to lead in policy harmonization across relevant ministries and the integration of models into policy decision processes. At the operational level, key background action is constituting the modelling team and inventorying the current models in use with the objective of establishing the technical and technological capacity baseline respectively. Based on this operational background, a gap analysis should be undertaken, covering:

- Gaps in the technological capabilities of the current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the above strategic trajectory.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory.

Based on the above gaps, work must take place with the project technical team to bridge identified gaps and establish the analytical decision framework. This would be achieved through a series of capacity-building actions – including webinars, hands-on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

Key activities accomplished in Kenya

Country technical modelling team constituted and confirmed. The team led by the GHG Inventory Coordinator under the Climate Change Secretariat of the Ministry of Environment consists of members drawn from universities and research institutes, technical experts from government ministries, and policymakers engaged in delivering Kenya's strategic priorities. These are the Ministry of Energy, the Ministry of Mining's Department of Resource Surveys and Remote Sensing, with expertise in data analysis, the Kenya Electricity Generating Company – the leading electric power generation company in Kenya, the Jomo Kenyatta University of Agriculture and Technology's Institute of Energy and Environmental Technology, a leading academic institution in technology; and the Kenya Forest Service and Kenya Forestry Research Institute – leading government technical agencies on forestry.

Gap analysis was conducted. Guidance was provided on expectations of the gap analysis to ensure the establishment of an analytical modelling structure that can inform clear climate objectives achieved and socioeconomic priorities realized by an investment trajectory of scaling up the select project level priorities and their amalgamation in relation to a business-as-usual investment scenario.

The key issues emphasized are the processes and envisaged end product.

On processes, emphasis was placed on the quality of sectoral data collection and analysis of the technical, tactical and technological gaps to be bridged with a view to forecasting the above Kenya strategic trajectory.

On the envisaged end product, the country team was advised to collect data that will inform a final product of modelling capacity-building – models and technicians that can forecast the carbon mitigated against income increases, cost savings, jobs created and percentage of GDP contributed or increased by the decision to prioritize investment scaling-up chosen project-level priorities and their amalgamation in relation to business-as-usual investment scenarios.

For example, in the current or near term – forecasting socioeconomic and climate impacts of scaling up investment in improved cook-stoves in domestic and commercial uses relative to a business-as-usual scenario of biomass or kerosene-based cooking facilities.

Long-term scenarios should be factored in, to forecast impacts of NDC priorities as Kenya industrializes with increased industrial-level electricity demand. Specifically, these relate to the socioeconomic and climate impacts of scaling up investment in large-scale and industrial-level geothermal power relative to business-as-usual or alternative investments in competing energy sources like thermal generators, coal (high emissions) or nuclear energy (which could potentially destroy the ecosystem).

The Kenya modelling team is to be linked up with the project technical team from the National Renewable Energy Laboratory (NREL), United States, to kick-start plans for capacity-building.

Next steps

The following measures are envisaged:

- Constituting and gazetting of the Kenya policy task force as a permanent feature in NDCs implementation policy decisions.
- Finalizing the gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling or extrapolating the chosen strategic trajectory – both carbon mitigation and climate impacts and socioeconomic parameters) and technological (inventory of models in use in relation to the technological capabilities needed to extrapolate carbon mitigation and climate impacts and socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to be bridged, with a view to updating the Kenya strategic trajectory.
- NREL technical focal point to launch webinars for the Kenya modelling team and to guide the process of bridging the above gaps.
- NREL technical focal point to lead the Kenya modelling team in customizing and adapting relevant models compatible with the current modelling progress in Kenya. This means the shortlisted models to be built up into a derivative model that can forecast or extrapolate the chosen strategic trajectory – climate objectives achieved (for example energy generation carbon mitigated; forest sinks preserved and enhanced) and socioeconomic priorities (jobs created; household income savings generate, among other effects) realized by an

investment trajectory of scaling up the select Kenya project-level priorities and their amalgamation relative to a business-as-usual investment scenario.

- NREL to undertake a training workshop on the use of adapted models and conduct simulations with the Kenya technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- Working with a policy task force to transfer and install relevant models into decision structures of the relevant line ministries.

2.3.2 Ghana

The aim is to establish an analytical decision framework to forecast the cumulative socioeconomic and carbon mitigation and climate impact of implementing Ghana's NDC objectives relative to business-as-usual investment trajectories. This would inform the establishment of optimal policy trajectories that can maximize climate objectives and socioeconomic priorities simultaneously in NDC implementation.

This framework has two critical components. At the strategic level is a harmonized policy decision-making structure across relevant line ministries. At the operational level is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with the relevant technical capacity to conduct the extrapolation.

To this end, a scoping meeting designed as a focus group discussion was held on 1 March 2017 and a follow-up technical meeting on 31 March to narrow down NDC priorities and target those most catalytic to accelerate achievement of the above. Consequently, Ghana stakeholders prioritized clean energy and agriculture at the sector level. These were further refined to the project level, where improved cook-stoves and waste to energy were selected under the energy sector and agroforestry under agriculture.

Based on these priorities, modelling actions (in other words the models to be customized and adopted, as well as technical and tactical capacity-building to be done) will put in place an analytical framework to inform carbon mitigated (forest sinks preserved and enhanced; indoor pollution abated) and socioeconomic priorities (jobs created; household income savings among others) to be realized by an investment trajectory of scaling up improved cook-stoves in domestic and commercial uses (for example catering establishments and small-scale value addition of agro-produce) and their amalgamation (the cumulative impact of biogas cook-stoves linked to process produce from agroforestry farms) in relation to a business-as-usual scenario of scaling biomass or kerosene-based cooking facilities and considering these projects in silo.

To this end, key background action at strategic level is constituting the policy task force to lead in policy harmonization across relevant ministries and integration of models into policy decision processes. At the operational level, key background actions are constituting the modelling team;

and inventorying the current models in use with the objective of establishing the technical and technological capacity baseline respectively. Based on this operational background, a gap analysis is undertaken, covering the following:

- Gaps in the technological capabilities of current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the above strategic trajectory.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory.

Based on the above gaps, work has commenced with the project technical team to bridge identified gaps and establish the analytical decision framework. This is taking place through a series of capacity-building actions – including webinars, hands on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

Key activities accomplished in Ghana

The interministerial policy task force has been constituted and is awaiting ministerial gazetting. Key policy members of the task force are drawn from the Ministry of Food and Agriculture, Ministry of Energy and Ministry of Environment. Non-State members are from the university sector (United Nations University, University of Development Studies) and the private sector and non-governmental organizations (Zoomlion Ghana Limited – a private enterprise in waste management and environmental sanitation; Centre for Energy and Climate Policy – a non-profit body) to participate as ex-officio members to refine policies from academic and applications level respectively.

The country technical modelling team has been constituted and confirmed. The team is led by the Energy Commission – a technical agency under the Ministry of Energy consisting of members drawn from universities and research institutes (University of Ghana – Economics Department), and technical agencies of the Government (Environmental Protection Agency, Ghana Statistical Service, Forestry Commission).

The inventory of models in Ghana has been evaluated for suitability. Key models evaluated are the Threshold 21 integrated model, the Long Range Energy Alternatives Planning System model, ALU and COPERT V.

Gap analysis: guidance has been provided on expectations of the gap analysis to ensure the establishment of an analytical modelling structure that can inform clear climate objectives achieved and socioeconomic priorities realized by an investment trajectory of scaling up the select project level priorities and their amalgamation in relation to a business-as-usual investment scenario.

Key issues emphasized are the processes and envisaged end product.

On **processes,** the emphasis is on the quality of sectoral data collection and analysis of the technical, tactical and technological gaps to be bridged, with a view to forecasting the above Ghana strategic trajectory.

On the **envisaged end product**, the country team is advised to collect data that will inform a final product of modelling capacity-building – models and technicians that can forecast the carbon mitigated against income increases, cost savings, jobs created and percentage of GDP contributed to or increased by the decision to prioritize investment in scaling up chosen project-level priorities and their amalgamation relative to business-as-usual investment scenarios.

The Ghana modelling team linked up with the project technical team from the Energy Research Centre of the Netherlands (ECN), to kick-start plans for capacity-building.

Next steps

The following measures are envisaged:

- Finalizing the gazetting of the Ghana policy task force as a permanent feature in NDCs implementation policy decisions.
- Finalizing the gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling or extrapolating the chosen strategic trajectory – both carbon mitigation and climate impacts and socioeconomic parameters) and technological (suitability of inventory of models in use in relation to the technological capabilities needed to extrapolate carbon mitigation and climate impact and the socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to be bridged, with a view to updating the Ghana strategic trajectory.
- ECN technical focal point to launch webinars for the Ghana modelling team and guide processes of bridging above gaps.
- ECN technical focal point to lead the Ghana modelling team in customizing and adapting relevant models compatible with current modelling progress in Ghana. This means the shortlisted models to be built up into a derivative model that can forecast the chosen strategic trajectory climate objectives achieved (for example energy generation carbon mitigated; forest sinks preserved and enhanced) and socioeconomic priorities (for example jobs created and household income savings.) realized by an investment trajectory of scaling up the select Ghana project-level priorities and their amalgamation in relation to a business-as-usual investment scenario.
- ECN to undertake a training workshop on the use of adapted models and conduct simulations with the Ghana technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- Working with the policy task force to transfer and install relevant models into the decision structures of the relevant line ministries.

2.3.3 Zambia

The aim is to establish an analytical decision framework to forecast the cumulative socioeconomic and climate impact of implementing Zambia's NDC objectives relative to the business-as-usual investment trajectories. This would inform the establishment of optimal policy trajectories that can maximize climate objectives and socioeconomic priorities simultaneously in NDC implementation.

This framework has two critical components. At the strategic level is a harmonized policy decision-making structure across relevant line ministries. At the operational level is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with relevant technical capacity to conduct the extrapolation.

To this end, a scoping meeting designed as a focus group discussion was held on 15 March 2017 and a follow-up technical meeting on 26 May 2017 to narrow down NDC priorities and target those most catalytic to accelerate achievement of the above. Consequently, Zambia stakeholders prioritized clean energy and AFOLU at the sector level. These were further refined to the project level, where off-grid renewable energy (solar PV and wind) to electrify rural areas and fuel switching of existing isolated diesel to mini-hydro were selected under the energy sector while forest enhancement, natural regeneration afforestation, and climate smart and conservation agriculture were the selected project priorities under AFOLU. For simplicity, agroforestry which overlaps with conservation agriculture and forest enhancement is proposed as the project-level priority under AFOLU.

Based on these priorities, modelling actions (in other words the models to be customized and adopted, as well as the technical and tactical capacity-building to be done) will put in place an analytical framework to inform carbon mitigated and climate objectives are achieved (for example the mitigation of energy generation carbon; and the enhancement and preservation of forest sinks) and socioeconomic priorities (jobs created; household income savings; and percentage of GDP increased etc.) to be realized by an investment trajectory of scaling up off-grid solar, wind, and micro-hydro powered agro-value addition of produce sourced from agroforestry farms at various levels (for example on-farm value addition of solar powered micro-irrigation or 5–30 MW off-grid solar, wind, and micro-hydro systems powering agro-processing factories) relative to business-as-usual scenarios (such as scaling diesel or petrol powered irrigation or grid-connected agro-processing) and considering investment in agroforestry and clean energy in silos.

To this end, key background action at strategic level is constituting the policy task force to lead in policy harmonization across relevant ministries and integration of models into policy decision processes. At the operational level, key background actions are constituting the modelling team; and inventorying the current models in use with the objective of establishing the technical and

technological capacity baseline respectively. Based on this operational background, a gap analysis is undertaken, covering:

- Gaps in the technological capabilities of the current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the above strategic trajectory.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory.

Based on the above gaps, work with the project technical team is necessary to bridge identified gaps and establish the analytical decision framework. This can be achieved through a series of capacity-building actions – including webinars, hands-on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

Key activities accomplished in Zambia

The country technical modelling team constituted and confirmed under the guidance of the Zambia United Nations Framework Convention on Climate Change focal point, the Ministry of the Environment. The institution to lead the modelling is the Zambia Meteorological Department under the Ministry of Transport and Communication. Among the key team members are the Centre for Energy, Environment and Engineering of Zambia; the Department of Energy; the Ministry of Energy; the Department of Agriculture; the Ministry of Agriculture; the Forestry Department, the Ministry of Lands and Natural Resources; the Zambia Institute for Policy Analysis and Research; the Central Statistical Office under the Ministry of National Development Planning; the Copper Belt University (Natural Resources); Mulungushi University (Department of Agriculture); and the National Remote Sensing Centre among key technical actors representative of both energy and AFOLU.

An inventory of the models in Zambia were evaluated for suitability in complementing the development of the new integrated model. Among the models shortlisted were the Long-range Energy Alternatives Planning System, the Comprehensive Mitigation Assessment Process (land use change or AFOLU), JEDI, MARKAL, DIAZ, GACMO, ZAMMOD, the Green Jobs Employment Projects model, the Modelling System for Agricultural Impacts of Climate Change, and Decision Support Systems for Agrotechnology Transfer.

Gap analysis: guidance was provided on expectations of the gap analysis to ensure establishment of an analytical modelling structure that can inform clear climate objectives (for example, energy generation carbon mitigated; and forest sinks preserved and enhanced) and socioeconomic priorities realized by an investment trajectory of scaling up the select project level priorities and their amalgamation in relation to a business-as-usual investment scenario.

Key issues emphasized are the processes and envisaged end product.

On **processes,** emphasis is placed on the quality of sectoral data collection and analysis of the technical, tactical and technological gaps to be bridged, with a view to forecasting the above Zambia strategic trajectory.

On the **envisaged end product**, the country team is advised to collect data that will inform a final product of modelling capacity-building – models and technicians that can forecast the carbon mitigated against income increases, cost savings, jobs created and percentage of GDP contributed or increased by the decision to prioritize investment in scaling up chosen project level priorities and their amalgamation in relation to business-as-usual investment scenarios.

The Zambia modelling team linked up with the project technical team from NREL, to kick-start plans for capacity-building.

Next steps

The following measures are envisaged:

- Constituting and gazetting the Zambia policy task force as a permeant feature in the NDCs implementation policy decisions.
- Conducting a gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling and extrapolating the chosen strategic trajectory – both carbon mitigation and climate impact and socioeconomic parameters) and technological (suitability of inventory of models in use relative to the technological capabilities needed to extrapolate carbon mitigation and climate impact and socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to be bridged, with a view to updating the Zambia strategic trajectory.
- The NREL technical focal point to launch webinars for the Zambia modelling team and guide the process of bridging the above gaps.
- The NREL technical focal point to lead the Zambia modelling team in customizing and adapting relevant models compatible with the current modelling progress in Zambia. This means the shortlisted models are to be built up into a derivative model that can forecast the chosen strategic trajectory – climate objectives achieved and socioeconomic priorities realized by an investment trajectory of scaling up the select Zambia project-level priorities and their amalgamation relative to a business-as-usual investment scenario.
- NREL to undertake a training workshop on the use of adapted models and conduct simulations with the Zambia technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- Working with the policy task force to transfer and install relevant models into decision structures of the relevant line ministries.

2.3.4 Mozambique

The aim is to establish an analytical decision framework to forecast the cumulative socioeconomic and climate impact of implementing Mozambique's NDC objectives which aim for synergy between adaptation and mitigation in relation to business-as-usual investment trajectories. This would inform the establishment of optimal policy trajectories that can maximize climate objectives and socioeconomic priorities simultaneously in NDC implementation.

This framework has two critical components. At the strategic level there is a harmonized policy decision-making structure across relevant line ministries. At the operational level there is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with the relevant technical capacity to conduct the extrapolation.

To this end, a scoping meeting designed as a focus group discussion was held on 29 March 2017 and a follow-up technical meeting on 22 May to narrow down NDC priorities and target those most catalytic to accelerate achievement of the above. Consequently, Mozambique stakeholders prioritized agriculture and energy at the sector level. These were further refined to the project level, where decentralized solar powered micro-irrigation was selected under the energy sector, while agroforestry was selected under agriculture.

Based on these priorities, modelling actions (that is the models to be customized and adopted, as well as the technical and tactical capacity-building to be done) will put in place an analytical framework to inform the climate objectives achieved and socioeconomic priorities to be realized by an investment trajectory of scaling up solar powered micro-irrigation in agroforestry farms relative to business-as-usual scenarios – scaling diesel or petrol-powered irrigation and considering investment in agroforestry and solar-powered micro-irrigation in silos.

To this end, key background action at the strategic level is constituting the policy task force to lead in policy harmonization across relevant ministries and in the integration of models into policy-decision processes. At the operational level, key background actions are constituting the modelling team; and inventorying the current models in use with the objective of establishing the technical and technological capacity baseline respectively. Based on this operational background, a gap analysis should be undertaken, covering:

- Gaps in the technological capabilities of the current models inventory in the context of modelling the carbon mitigated and socioeconomic impact of the above strategic trajectory.
- Gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of the strategic trajectory.

Based on the above gaps, work is carried out with the project technical team to bridge identified gaps and establish the analytical decision framework. This took place through a series of

capacity-building actions – including webinars, hands on adapting and testing of models, transfer of relevant technologies and training and demonstration workshops.

Key activities accomplished in Mozambique

The confirmed country modelling team lead institution is the Faculty of Agriculture and Forestry at Eduardo Mondlane University.

An inventory of models in Mozambique was evaluated for suitability in complementing the development of the new integrated model. Among the models shortlisted are STATA for agriculture and the Long-range Energy Alternatives Planning System, GAGMO and the Open Source Energy Modelling System for energy.

Gap analysis – guidance was provided on expectations of the gap analysis to ensure establishment of an analytical modelling structure that can inform clear climate objectives achieved and socioeconomic priorities realized by an investment trajectory of scaling up the selected project-level priorities and their amalgamation in relation to a business-as-usual investment scenario.

Key issues emphasized are the **processes** and **envisaged end product**.

On processes, emphasis is placed on the quality of sectoral data collection and analysis of the technical, tactical and technological gaps to be bridged, with a view to forecasting the above Mozambique strategic trajectory.

On the envisaged end product, the country team is advised to collect data that will inform a final product of modelling capacity-building – models and technicians that can forecast the carbon mitigated against income increases, cost savings, jobs created and the percentage of GDP contributed to or increased by the decision to prioritize investment scaling up chosen project level priorities and their amalgamation relative to business-as-usual investment scenarios.

The lead of the Mozambique modelling team linked up with the project technical team from the Energy Research Centre of the Netherlands (ECN), to kick-start plans for capacity-building.

Next steps

The following measures are envisaged:

- Finalizing the constitution of the country technical modelling team to be led by the Faculty of Agriculture and Forestry at Eduardo Mondlane University.
- Constituting and gazetting the Mozambique policy task force as a permeant feature in the NDCs implementation policy decisions.

- Conducting a gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling or extrapolating the chosen strategic trajectory – of both carbon mitigation and climate impact and socioeconomic parameters) and technological (suitability of inventory of models in use relative to the technological capabilities needed to extrapolate carbon mitigation and climate impact and socioeconomic aspects of the chosen strategic trajectory and future expansions) gaps to be bridged, with a view to updating the Mozambique strategic trajectory.

- ECN technical focal point to launch webinars for the Mozambique modelling team and guide the process of bridging the above gaps.

- ECN technical focal point to lead the Mozambique modelling team in customizing and adapting relevant models compatible with current modelling progress in Mozambique. This means the shortlisted models to be built up into a derivative model that can forecast the chosen strategic trajectory – climate objectives achieved (for example energy generation carbon mitigated; forest sinks preserved and enhanced) and socioeconomic priorities (jobs created; household income savings etc.) realized by an investment trajectory of scaling up the selected Mozambique project-level priorities and their amalgamation relative to a business-as-usual investment scenario.

- ECN to undertake a training workshop on the use of adapted models and conduct simulations with the Mozambique technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.

- ECN to work with the policy task force and modelling team to transfer and install relevant models into decision structures of the relevant line ministries.

2.3.5 Morocco

The aim is to establish an analytical decision framework to forecast the cumulative socioeconomic and climate impact of implementing Morocco's NDC objectives that seek to balance adaptation with an economy-wide emissions reduction for mitigation relative to business-as-usual investment trajectories. This would inform the establishment of optimal policy trajectories that can maximize climate objectives and socioeconomic priorities simultaneously in NDC implementation.

This framework has two critical components. At the strategic level is a harmonized policy decision-making structure across relevant line ministries. At the operational level is an analytical modelling structure comprising relevant software and hardware technologies and a team of modellers with relevant technical capacity to conduct the extrapolation.

Key activities accomplished in Morocco

Modelling scoping meeting designed as a focus group discussion, rescheduled for 22 February 2018 owing to unforeseen in-country challenges.

In order to make up the lost time due to unforeseen delays, remote guidance is provided to the country stakeholders as follows:

- The project management team launched virtual technical support to assist country stakeholders in narrowing down NDC priorities to target the sectors with the most catalytic potential to accelerate achievement of the NDCs as set out above.

With this guidance, country stakeholders identify key initiatives that the project should build on to ensure that it complements the most relevant priorities in the country. These are the third and fourth National Communication, a World Bank modelling intervention, and the EU/UNDP project on low emission capacity-building, in which Morocco stakeholders are prioritized. Drawing on the above, with the guidance of the project management team, Moroccan stakeholders identify energy, housing infrastructure, transport, industry, agriculture and waste as priority sectors to ensure that the implementation of Morocco NDCs maximizes climate objectives simultaneously with leading socioeconomic priorities.

Preliminary support is provided to country stakeholders to narrow down these sectoral priorities to project level and establish optimal project combinations and amalgamation that can maximize both the climate and socioeconomic impacts of these sectors. It is these on which the modelling structure will be based.

Next steps

The following measures are envisaged:

- Providing remote support to country stakeholders to finalize the narrowing down and refining of project-level priorities and relevant amalgamations to establish the strategic trajectory on which modelling will be based.

- Providing remote support to country stakeholders to establish the country team – policy task force and technical modelling team, in the context of the established strategic trajectory.

- Providing remote support to the country team to kick-start a gap analysis: evaluating the current inventory of models and shortlisting relevant models in the context of a strategic trajectory; establishing gaps in the technological capabilities of the models in the context of modelling the carbon mitigated and socioeconomic impact of the established strategic

trajectory; gaps in the technical capacity of the modelling team to model the carbon mitigated and socioeconomic impact of this strategic trajectory.

- Linking the Morocco team with the project technical team for virtual technical backstopping on bridging established gaps through the first round of webinars.
- Conducting a scoping meeting and focus group discussion on 22 February 2018 for face-to-face deliberations and clarifications on the above actions.
- Launching substantive capacity-building actions, as follows:
    - Finalizing the gap analysis – sectoral data collection and analysis of the technical, tactical (technical skills of the modelling team in context of modelling or extrapolating the chosen strategic trajectory – both carbon mitigation and climate impact and socioeconomic parameters) and technological (inventory of models in use in relation to the technological capabilities needed to extrapolate carbon mitigation and climate impact and socioeconomic aspects of the chosen strategic trajectory) gaps to be bridged, with a view to updating the Morocco strategic trajectory.
- NREL technical focal point to launch a second round of webinars for the Morocco modelling team on specific aspects to guide the processes of bridging the above gaps.
- NREL technical focal point to lead the Morocco modelling team in customizing and adapting relevant models compatible with the current modelling progress in Morocco. This means the shortlisted models to be built up into a derivative model that can forecast the socioeconomic and climate impacts of scaling the chosen strategic trajectory relative to a business-as-usual investment scenario.
- NREL to undertake a training workshop on the use of adapted models and conduct simulations with the Morocco technical team to demonstrate the effectiveness of adapted models and cross-ministerial collaboration in deploying models.
- NREL to work with the policy task force and modelling team to transfer and install relevant models into decision structures of the relevant line ministries.

2.4 Subregional and regional peer-to-peer knowledge-sharing forums

The subregional and regional peer-to-peer knowledge-sharing forums will be kick-started once component 1 and 2 deliverables are achieved. These will be led by reputable regional institutions currently engaged in project actions and undergoing capacity-building. These champion institutions will undertake elaborate direct training on the demonstrated NDCs implementation approach in response to country NDC priorities within their network, prioritizing institutional stakeholders from non-participating countries in their subregions. This will build a consolidated network of stakeholders on the paradigm being followed for components 1 and 2.

Being institutions of regional repute that engage across the continent, they will also infuse the project products into the curriculum, including e-learning courses and research. Models will also be integrated into laboratories of these institutions. Cumulatively, this is expected to catalyse a continent-wide shift to a country-driven NDC implementation focused on maximizing socioeconomic and climate benefit, as informed by project lessons.

At the continental level, given the commonality of challenges – hence compatibility of solutions, one continental-level conference will be conducted. Here, all subregional champions and institutions in their networks that have been trained will convene together with a broader pool of continental stakeholders from non-participating countries in all the five subregions. The aim will be to share practical lessons and cross-hybridize innovative proven approaches on both components 1 and 2. Furthermore, the project lessons will be diffused across the continent through the African Ministerial Conference on the Environment (AMCEN), whose secretariat is hosted by the United Nations Environment Programme.

Accomplishments

- Action plans to engage lead institutions developed in collaboration with project technical partners.
- Three modelling research institutions – the University of Yaoundé 1 in Cameroon; the University of Eduardo Mondlane in Mozambique; the Centre for Energy, Environment and Engineering in Zambia – among others currently working in partnership with this project, will infuse lessons into the curriculum and research work and disseminate the same across the continent through a peer-learning network covering each of the five regions of Africa that will have its hubs in the institutions selected.

3. Project visibility

Continuing virtual and physical networking will be conducted to share project progress and success with a global audience:

- The project website is maintained and content updated periodically. The website has reached over 76,000 people worldwide and registers on average nearly 5,000 visits per month. The project has a social media account on Twitter, employed to disseminate project progress and lessons.

- Presentation of the project was made at a continental event on a low emissions development conference, on the theme "Climate change and development in Africa – Unlocking LEDS implementation on the African continent", held on 4 and 5 October 2017 in Abidjan, Côte d'Ivoire.

4. Conclusion and next steps

Project implementation is on track. All eight countries have established priority sectors and trajectories that implementation actions should follow to ensure NDCs implementation maximizes climate objectives simultaneously with unlocking the leading socioeconomic priorities of these countries. Implementation teams in all the three levels of this project – the ground demonstration actions, the policy task forces and the modelling analytical framework – have been established to various degrees. For example, all the three component 1 and 2 countries – Cameroon, Côte d'Ivoire and the Democratic Republic of the Congo – have established the policy task force, modelling teams and the ground demonstration teams while Ghana is the only component 2 country that has constituted a policy task force team.

Feasibility studies for the ground demonstration are 75 per cent complete in Cameroon with three sites already selected and one final site currently being evaluated. In Côte d'Ivoire, feasibility studies are complete and all necessary ground actors to build on have been mobilized. In the Democratic Republic of the Congo, feasibility studies have resumed after a slow down occasioned by the Ebola outbreak and government restructuring.

On modelling actions, the inventory of models has been evaluated in Cameroon and Côte d'Ivoire and select models shortlisted for further development in line with modelling the project trajectory in these countries. Gap analysis covering both the technical and technological capacity has kick-started and the country teams have been linked with the project technical teams for targeted capacity-building actions.

For the component 2-only countries, modelling teams have been established in three countries – representing 60 per cent progress. Three countries – Ghana, Mozambique and Zambia have evaluated their models inventory and shortlisted relevant ones for further development in line with modelling the project trajectory in these countries. At the policy level, Ghana has constituted the policy task force awaiting gazetting by the minister as a permanent task force to harmonize policy processes for the implementation of NDCs. Guidance to conduct the gap analysis covering both the technical and technological capacity has been provided in four of the five countries – Ghana, Kenya, Mozambique and Zambia and the country teams linked up with the project technical team for the first round of preliminary capacity-building actions to bridge the gaps.

On the regional peer-to-peer learning network, mapping out and scouting reputable regional technical institutions from among those participating in the modelling activities is ongoing.

On the immediate next steps up to the end of 2017 and start of 2018, Cameroon and Côte d'Ivoire will engage primarily in operationalizing the ground actions given that feasibility studies are over 80 per cent complete. The Democratic Republic of the Congo on the other hand will focus more on finalizing the feasibility studies and shortlisting sites for the ground actions as well as undertaking the scoping meeting. On the policy task force, all three countries will focus on gazetting their task forces at ministerial level as permanent task forces to harmonize policy processes for the implementation of NDCs.

On the modelling actions, the Democratic Republic of the Congo will focus on evaluating the current models inventory to shortlist the most suitable ones that can be developed further to model the chosen trajectory in readiness for gap analysis. Cameroon and Côte d'Ivoire will focus on finalizing their gap analysis and linking up with the project technical team for specific capacity-building actions to bridge established gaps.

For the five component 2 only countries, at the policy level, all four countries (except Ghana) will focus on establishing their policy task forces. The Ghana team will focus on gazetting their task force at a ministerial level as permanent task forces to harmonize policy processes for the implementation of NDCs.

On the modelling aspect, three countries – Ghana, Mozambique and Zambia which have shortlisted relevant models, will focus on finalizing their gap analysis and engaging with the project technical team to bridge identified gaps. Kenya and Morocco will focus on evaluating their models inventory and shortlisting most relevant models for further development in line with modelling the project trajectory in these countries. Morocco will also concurrently work to refine project-level priorities with guidance from the project management team. These countries will then launch their gap analysis and link up with the project technical team for capacity-building actions to bridge specified gaps.

On the peer-learning network, the most suitable subregional hub institutions which already engage with the project in each of the five major subregions in the continent – Central, East, North, South and West Africa – will be established to be responsible for peer networks in their respective subregions. The criteria for shortlisting includes – institutions currently being engaged in project activities and the level of regional influence – indicated by the number, quality and variability of stakeholder institutions already in the potential hub institutions' network.

5. Annex: Summary of project progress by outputs as captured in the log frame

Project component	Project outputs	Indicators	Means of verification	Progress made/results achieved
Component 1: LEDS planning and implementation support	LEDS initiatives developed or improved	3 partner countries develop or improve LEDS plans	LEDS plans prepared by the countries	– Constitution of in-country implementation teams at policy (interministerial policy task force) and operational levels (pilot demonstration actors) finalized in Cameroon, the Democratic Republic of the Congo and Côte d'Ivoire. These teams will develop LEDS plans and strategic policy directions. – Feasibility studies for ground LEDS initiatives that project will build finalized in Côte d'Ivoire and 80% complete in Cameroon and ongoing in DRC. Ground actions will validate strategic policy directions.
	Implementation of specific LEDS measures initiated	3 partner countries initiate formulation and implementation of LEDS measures for key emissions sectors or economy wide	National and sectoral policy documents and plans and progress reports	– Interministerial policy task force to lead in policy harmonization for LEDS actions established in Cameroon, Côte d'Ivoire and the Democratic Republic of the Congo. Team to develop LEDS policy documents. – Feasibility studies for ground LEDS initiatives to validate strategic LEDS policy positions complete in Côte d'Ivoire, 80% complete in Cameroon and ongoing in the Democratic Republic of the Congo.
	Enhanced global and regional knowledge of LEDS planning and implementation	At least 5 non-partner African countries actively participating in peer forums More than 1 non-partner country formulating LEDS plans based on shared project knowledge Non-partner countries	Survey to collect feedback from countries on use of knowledge and capacity to help strengthen their LEDS and intended nationally determined contributions LEDS plans developed	– Website visible to global audience and continually updated with country-level implementation progress. – Twitter account engaged to promote project progress and update global audience including non-partner countries on project implementation progress, experiences and lessons. – Input based on project experiences to date compiled for publication in third

Project component	Project outputs	Indicators	Means of verification	Progress made/results achieved
		develop and implement LEDS measures based on shared project knowledge	by non-partner states LEDS shared by non-partner countries	party journals to enhance LEDS knowledge in non-partner countries. – Ongoing engagement of reputable regional technical institutions representing each of the 5 subregions to lead in project lessons dissemination to non-partner countries. – Project to engage in third party continental events to share innovative approach of maximizing both the climate and socioeconomic impacts of the implementation of NDCs.
	LEDS champions cultivated	At least 3 institutions identified as LEDS champions to lead LEDS and implement peer-learning efforts LEDS training and equipping of identified champions Partnerships formed between champions to facilitate peer-learning	Written communication from champions on their engagement leading the peer-learning efforts Peer-learning efforts reports Active participation of champions in the LEDS online knowledge exchange platform	Already, 3 lead institutions within country implementation teams and 1 within project partner networks evaluated for shortlisting as champions. These will extend project work in the region as LEDS champions through the regional peer-learning network.
Component 2: LEDS modelling support	LEDS actions prioritization and decision-maker support for priority LEDS measures significantly enabled	Priority LEDS actions identified for 8 partner countries At least 8 countries with strengthened LEDS process as a result of the prioritization process	Results of the prioritization incorporated on LEDS or the implementation plan	– Modelling teams constituted in 6 countries – Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo, Ghana, Kenya and Zambia. – Policy task forces to guide integration of models into decision processes of relevant line ministries finalized in the 4 countries. – Inventory of models evaluated and models to be further developed to model chosen strategic trajectories of NDCs implementation shortlisted in 5 countries. – Gap analysis covering both technical and technological capacity building kick-started in 6 countries.
	Strengthened analysis and communication of LEDS benefits	At least 8 countries with strengthened stakeholder support for LEDS process as a result of improved	Evidence of communication products (e.g.., webinars, reports,	– Website visible to global audience and updated with relevant material on project progress and key lessons. – Twitter account engaged to promote

Project component	Project outputs	Indicators	Means of verification	Progress made/results achieved
		analysis and communication of LEDS benefits An Africa LEDS website in place as a continental LEDS knowledge management platform	newsflashes, webpages, policy briefs etc.) developed and presented to key stakeholders	project progress and for real-time project progress updates and lessons sharing with global audience including non-participating countries. – Input based on project experiences to date compiled for publication in third party journals to enhance LEDS knowledge in non-partner countries. – Project to engage in 3rd party continental events to share an innovative approach of maximizing both the climate and socioeconomic impacts of the implementation of NDCs.
	Improved LEDS modelling capacity	LEDS models adapted for target high emissions sectors economy wide Training of relevant personnel to lead LEDS modelling actions Partner country technical institutes conducting analysis with adapted models	Evidence of countries having adapted and utilized one or more of the LEDS modelling tools to guide the evaluation and design of their LEDS	– Modelling teams established in 6 countries – Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo, Ghana, Kenya and Zambia. – Inventory of models evaluated and models to be further developed to model chosen strategic trajectories of the implementation of NDCs in 5 shortlisted countries. – Gap analysis covering both technical and technological capacity-building launched in 6 countries.
	Improved regional and global knowledge	At least 2 non-partner countries report improved LEDS process due to peer-learning forums and project knowledge products Non-partner countries participate actively on LEDS modelling through knowledge platforms All 8 partner countries actively involved in LEDS modelling peer training and knowledge-sharing	Survey to collect feedback from countries on use of knowledge and capacity to help strengthen their LEDS and intended nationally determined contributions Active knowledge-sharing by non-partner and partner countries observed in knowledge-sharing platforms (website,	– Website visible to global audience updated with relevant material on project progress and key lessons. – Twitter account engaged for real-time project progress updates and lessons sharing with a global audience including non-partner countries. – Input based on project experiences to date compiled for publication in third party journals to enhance LEDS knowledge in non-partner countries. – Project to engage in 3rd party continental events to share the innovative approach of maximizing both climate and socioeconomic impacts of the implementation of NDCs.

Project component	Project outputs	Indicators	Means of verification	Progress made/results achieved
			joint reports etc.)	
Project component	**Project milestones:**			**Milestone progress (achieved/started/near complete/not started)**
	• Grant support agreements/contracts signed • Launch of the project at Africa LEDS Partnership event			Achieved N/A
LEDS planning and implementation support	• Inception phase, established activities and launched implementation • Country-specific support activities. • Case studies developed and distributed • Peer-learning and networking activities • LEDS country champions identified • Close out reports for each participating country published			Complete Started Not started Started Started Not started
LEDS modelling support	• Inception phase, activities established and implementation launched • Suite of models to work with finalized – selection • Training of in-country modelling teams • Training and capacity-building of regional technical institutes • Network of regional modellers, analysts as well as technical institutes for sustainability of project outputs formulated and installed • Knowledge and communication products based on the project and the benefits of LEDS developed and shared with the global community			Started, near complete Started Started Started Started Started